



MI's Wind Energy Experience: Separating Fact from Fiction

by
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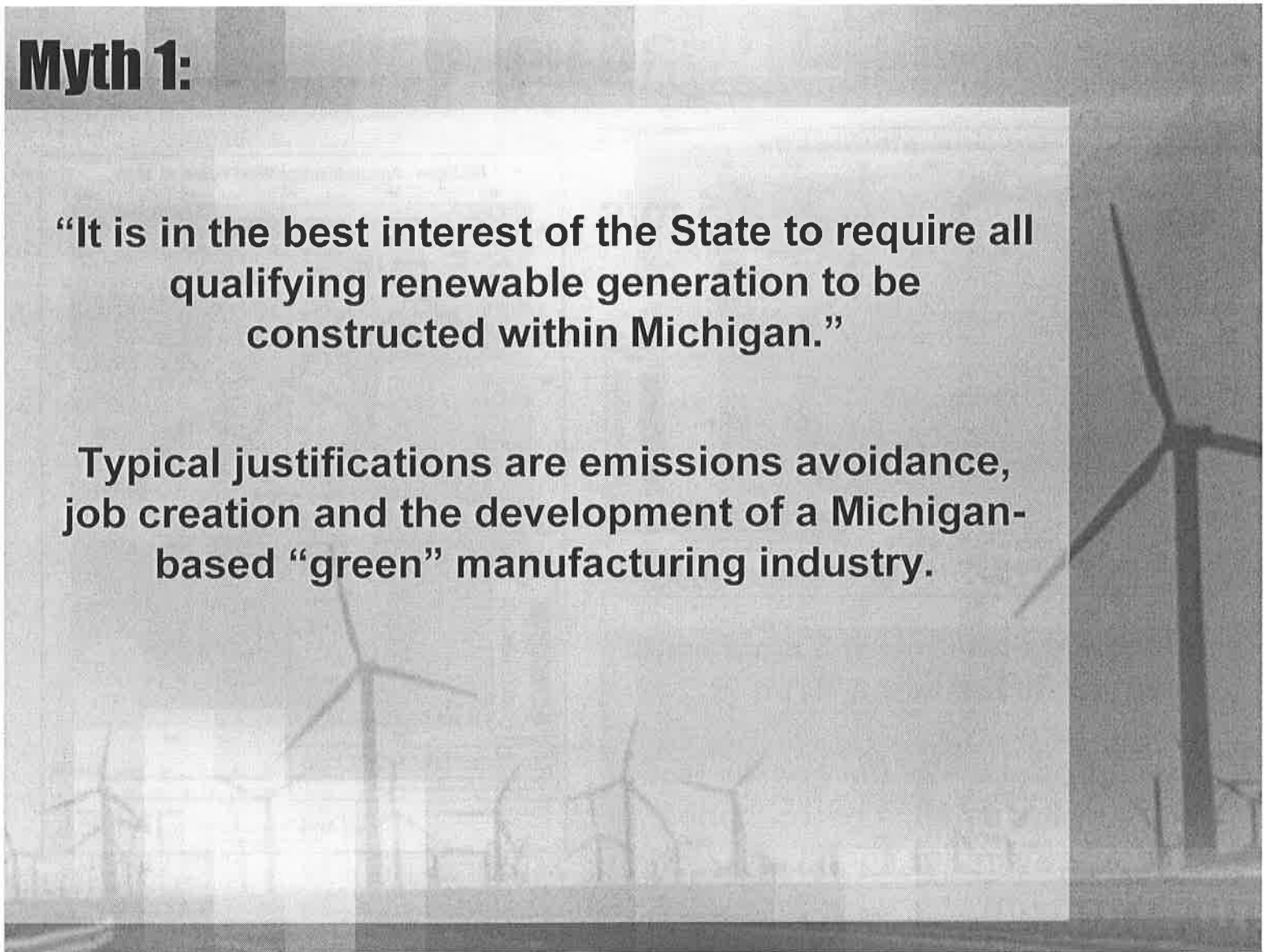
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Myth 1:

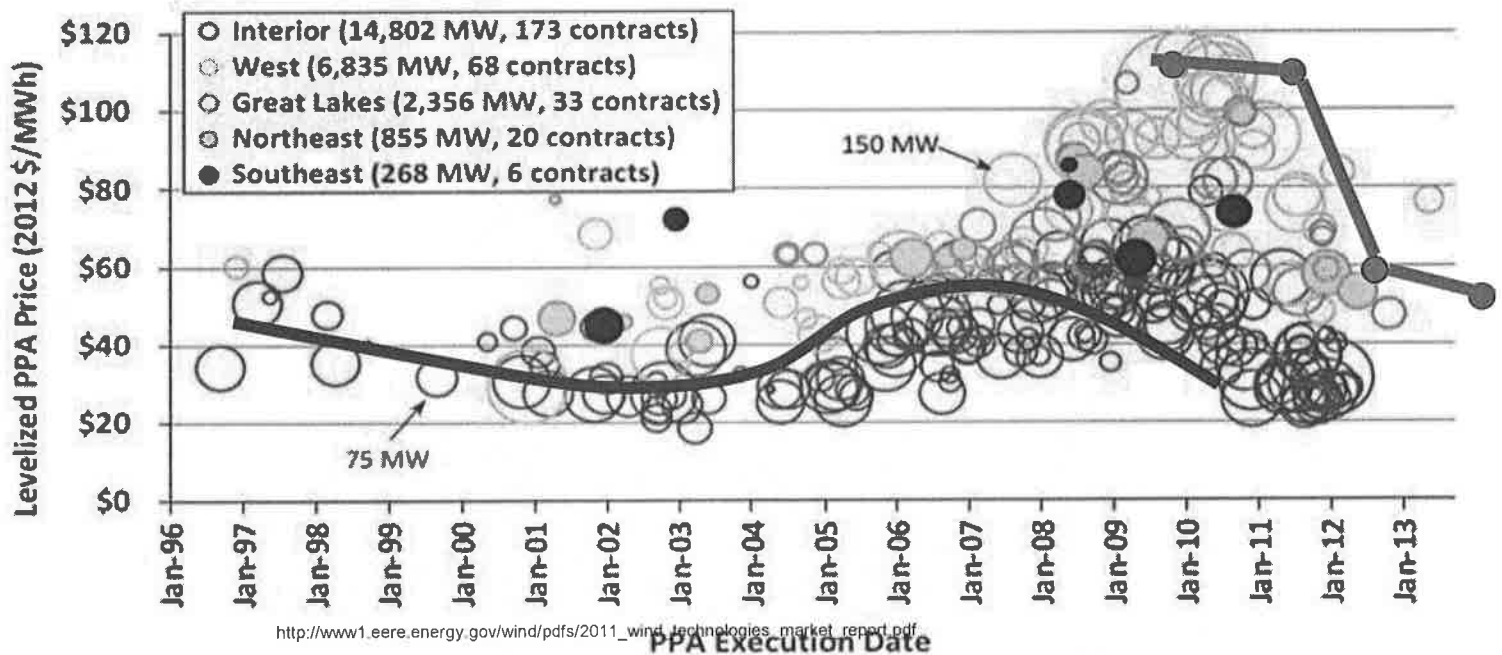
“It is in the best interest of the State to require all qualifying renewable generation to be constructed within Michigan.”

Typical justifications are emissions avoidance, job creation and the development of a Michigan-based “green” manufacturing industry.



Are new taller turbines more competitive?

No. Any technological advancement in low-wind turbine designs brings even greater benefits to high-wind areas like IA and MN.



Note: Size of "bubble" is proportional to project nameplate capacity.

Ohio concurs:

Not only has Ohio frozen both their EE and RE mandates in order to review the policies, they have permanently eliminated the instate requirement for renewable energy.

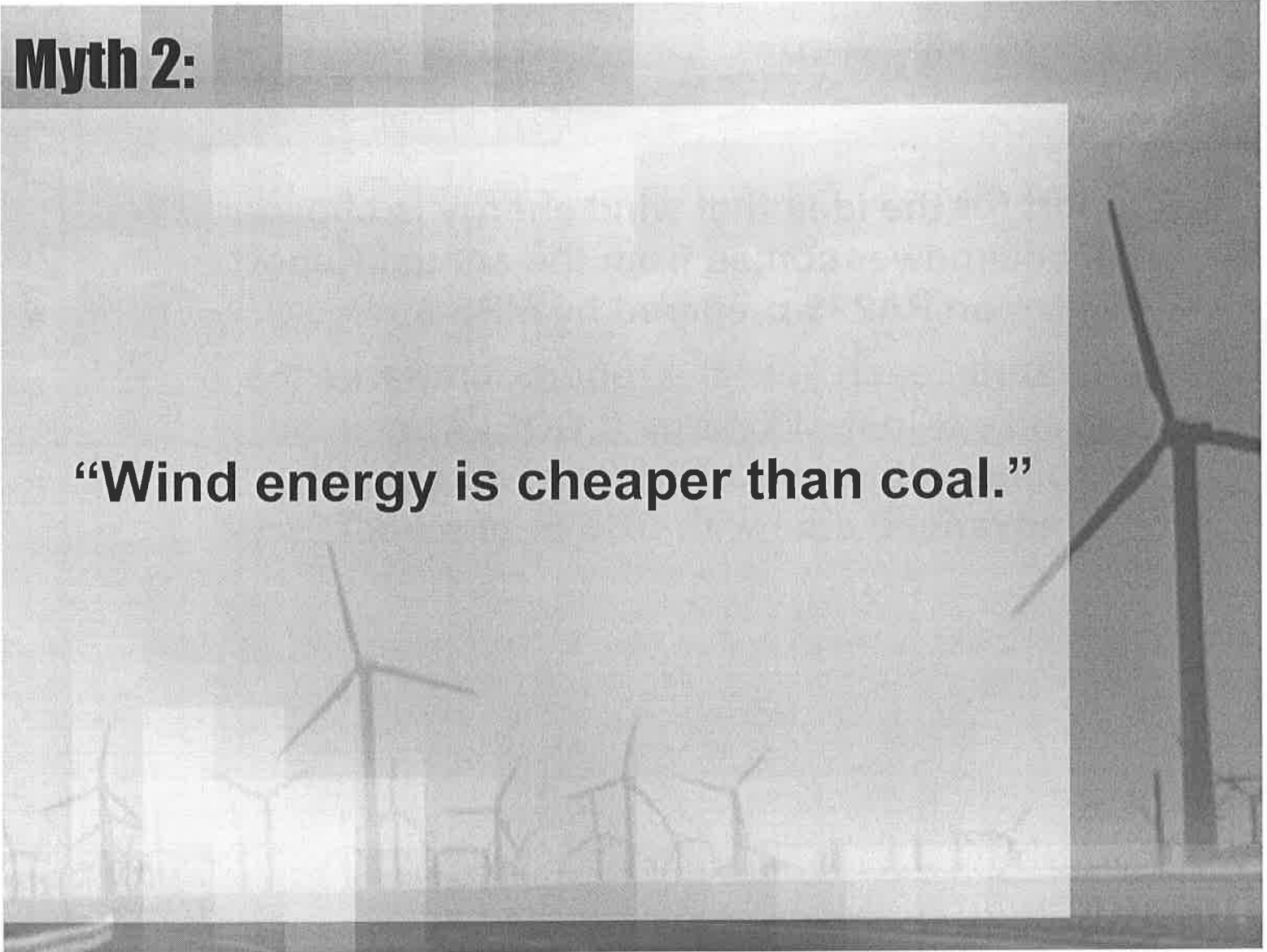
Senator Bill Seitz, Chairman of the Senate Public Utilities Committee led the charge.

His efforts enjoyed the support of AEP, Duke, FirstEnergy, OH Chamber, IEU and hundreds of others.



Myth 2:

“Wind energy is cheaper than coal.”



Consequence:

As a result of this annual report, people are led to believe that wind energy is a cheap alternative to coal plants:

GREEN TECHNOLOGY, SOLAR POWER, WIND ENERGY

REPORT SHOWS MICHIGAN WIND POWER NOW CHEAPER THAN COAL

🕒 FEBRUARY 13, 2015 👤 ESDMATTROUSH 💬 LEAVE A COMMENT

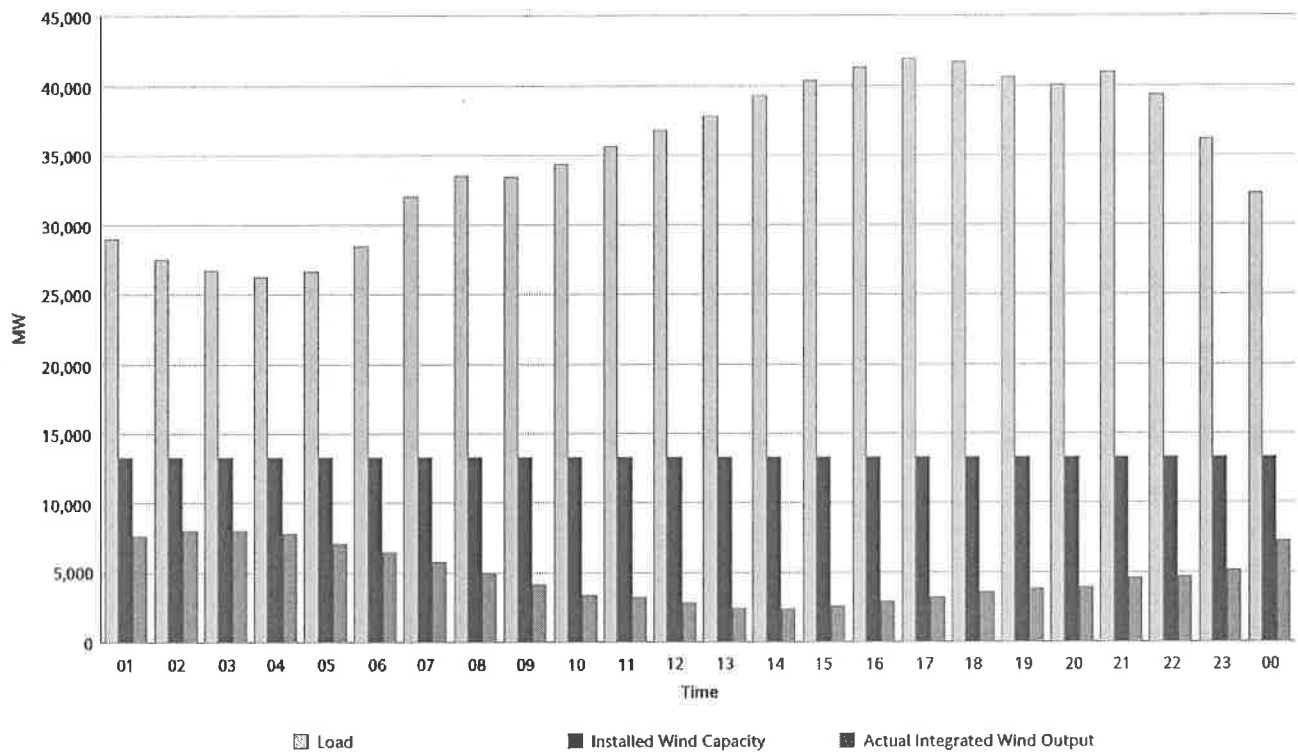
LANSING — Renewable wind energy is now cheaper than electricity from coal, according to the Michigan Public Service Commission's fifth annual report on the state's renewable energy standard and its cost effectiveness.

The report shows the weighted average price of existing renewable energy contracts is \$76.55 per megawatt-hour, which the report noted was "significantly lower than the cost of coal-fired generation plants."

ERCOT:

Hourly Average Actual Load vs. Actual Wind Output

03/31/2015



Wind output is lowest when energy is most valuable, and conversely.

Accurate way to compare wind \$ with fossil \$:

Wind turbines are not a replacement for fossil fuel plants. Wind turbines are merely a *fuel saving accessory* that can be added to existing fossil-fueled plants.

Michigan's average subsidized wind price is \$75/MWh. Adding subsidies and tax credits to this PPA price easily raises the unsubsidized average wind price to over \$100/MWh.

But the value of the fuel saved by adding wind to our portfolio is only ~\$25/MWh for coal or ~\$35/MWh for natural gas.

That is a poor value.

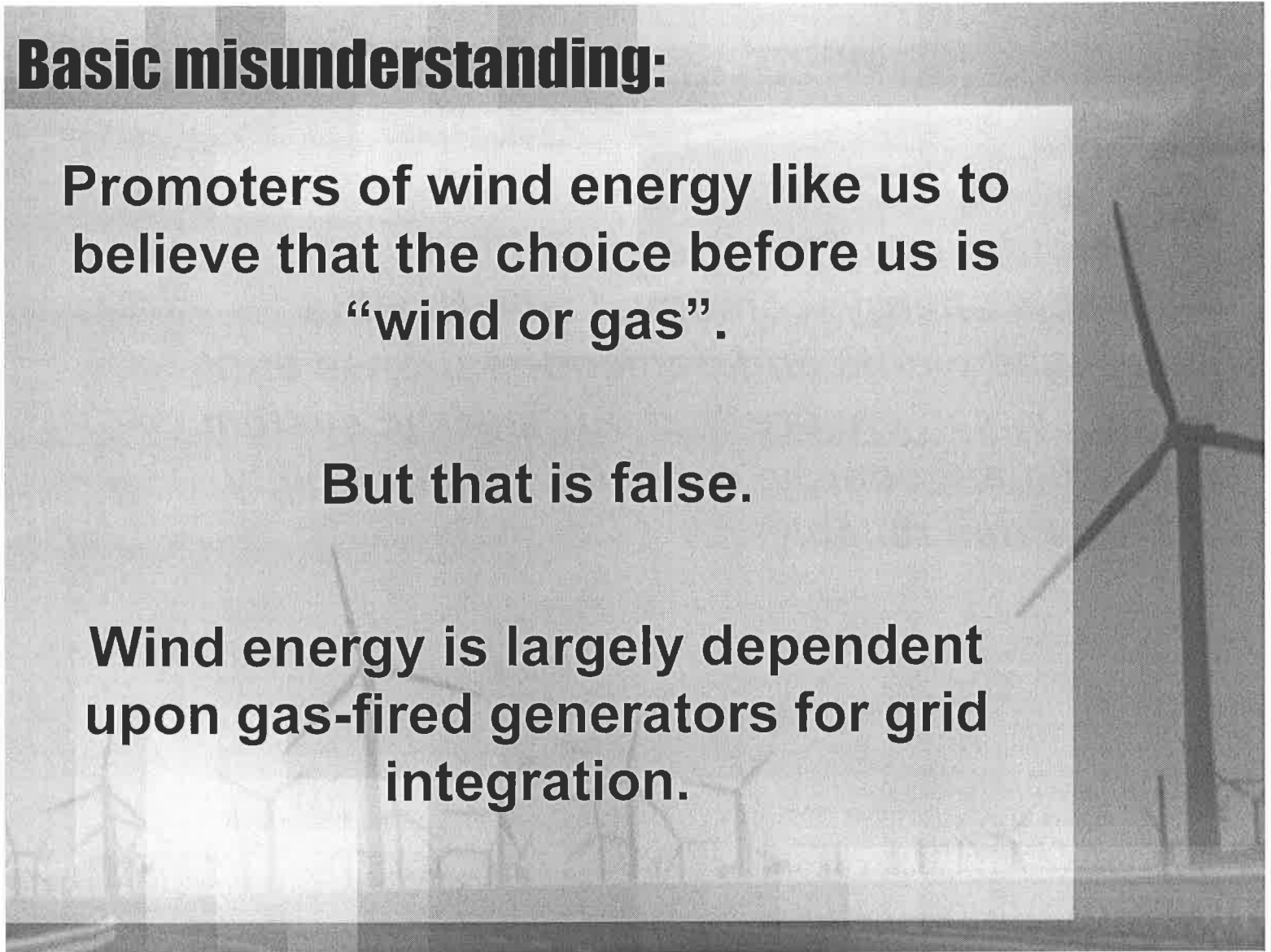


Basic misunderstanding:

Promoters of wind energy like us to believe that the choice before us is “wind or gas”.

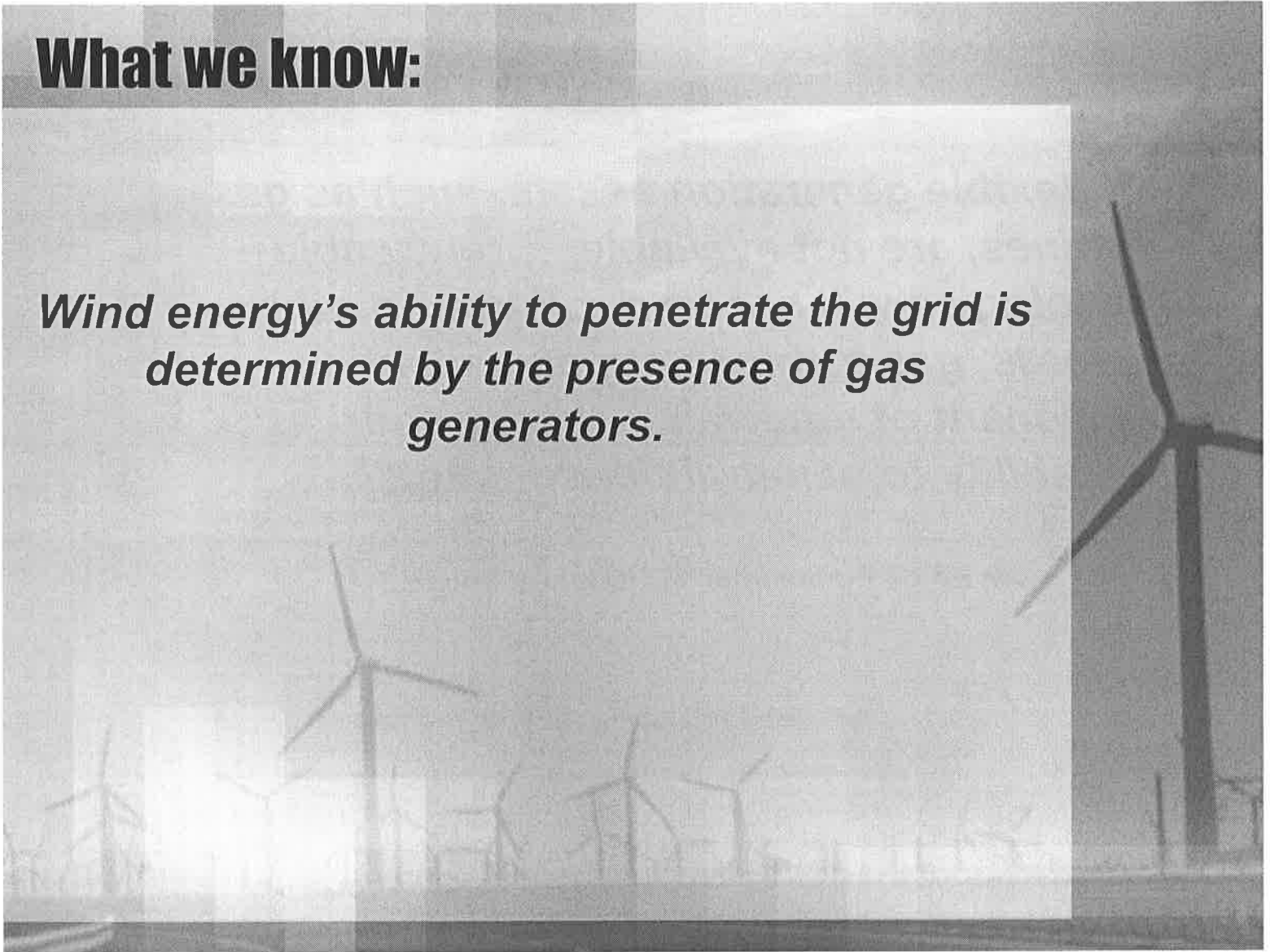
But that is false.

Wind energy is largely dependent upon gas-fired generators for grid integration.



What we know:

Wind energy's ability to penetrate the grid is determined by the presence of gas generators.



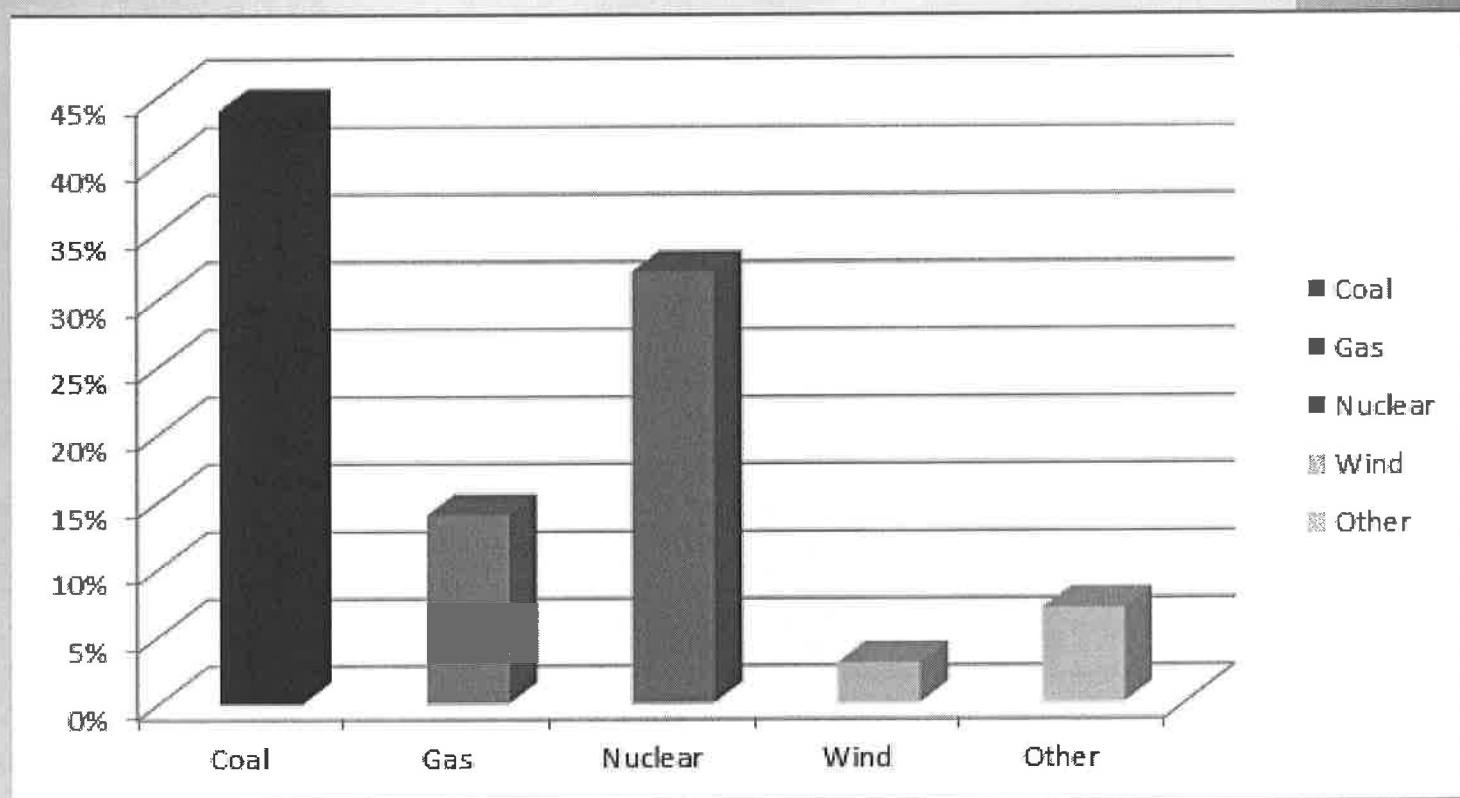
What's my point?

Unlike coal and nuclear power, wind energy is wholly dependent upon gas fired generation if substantial penetrations of wind are being deployed.

This means that the more wind generation in a given region the more gas generation that is required. More gas means more exposure to the gas market, not less.

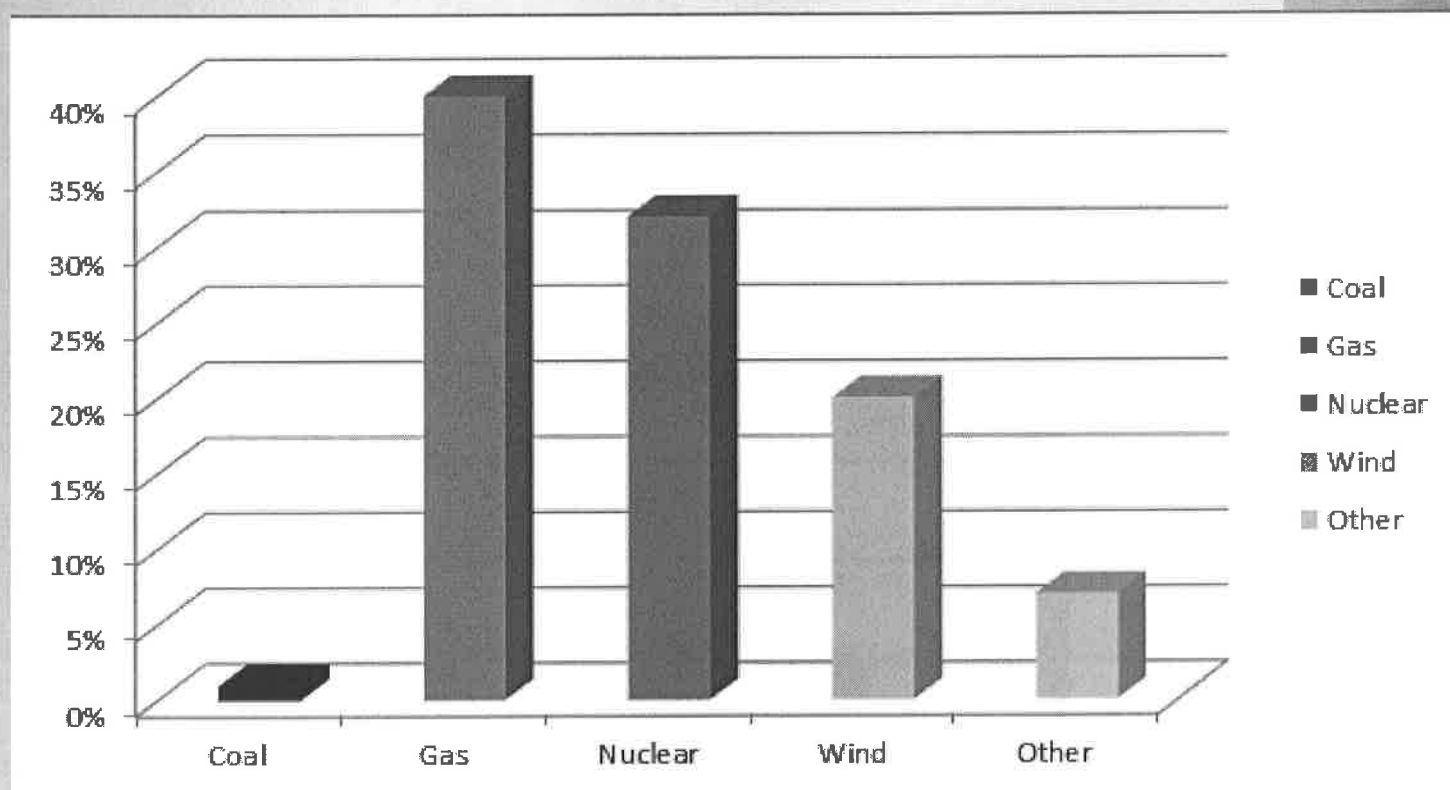
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC-CAISO_VG_Assessment_Final.pdf

MI 2014 Generation Profile:



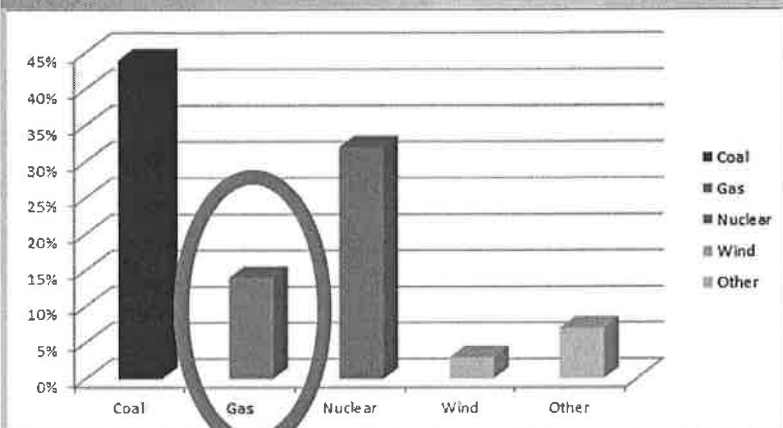
44% coal, 14% gas, 32% nuke, 3% wind. 7% other

20% wind:



1% coal, 40% gas, 32% nuke, 20% wind,

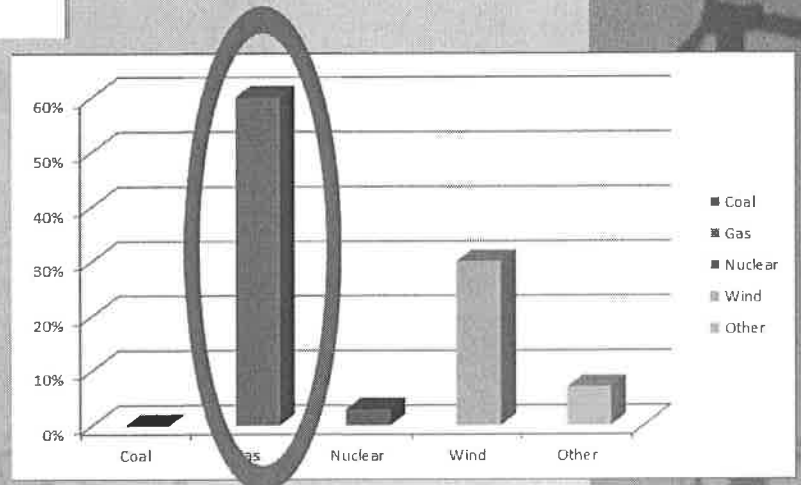
BAU versus 30% wind:



Our current profile...

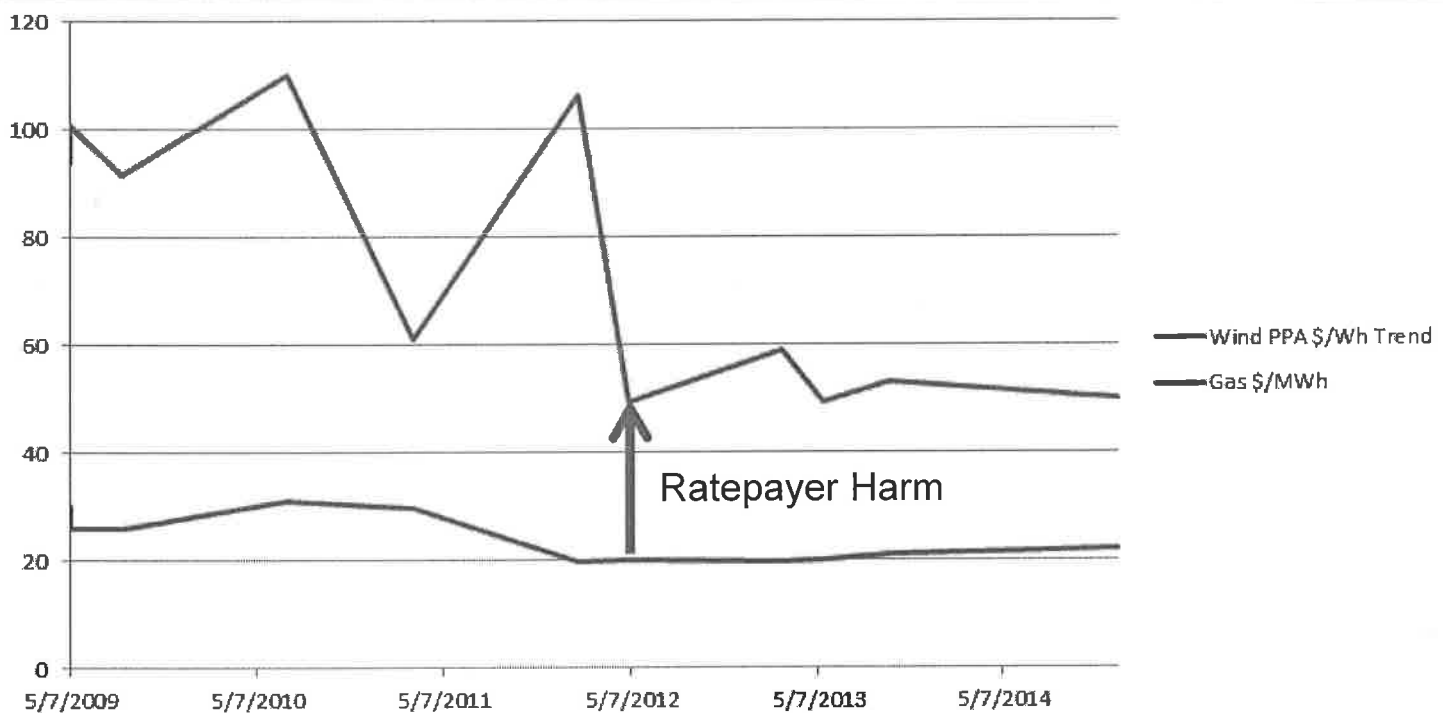
30% wind could essentially quadruple our exposure to the gas market.

That is not a hedge.



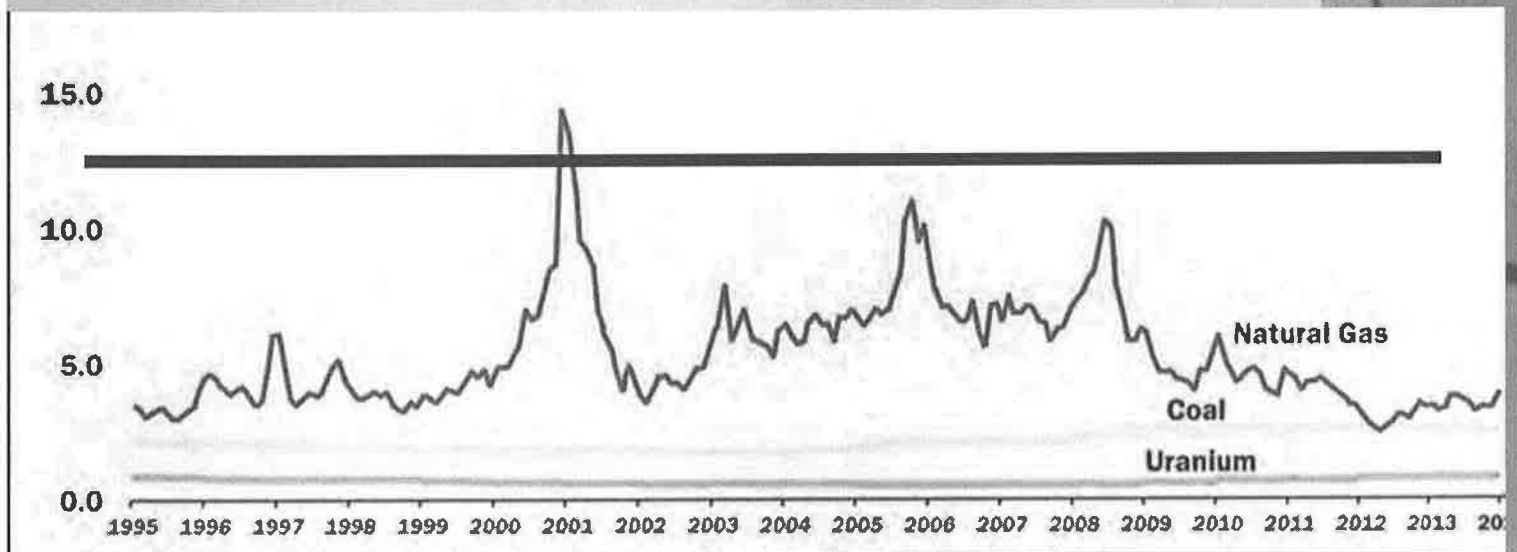
...or 30% wind?

Looking back, was wind a hedge?



At no point since 2008 has a subsidized MI wind PPA cost less than the gas fuel it has saved. In fact wind has cost ratepayers 2.5-5x the value of the gas fuel saved.

\$80 Wind PPA a gas price hedge?



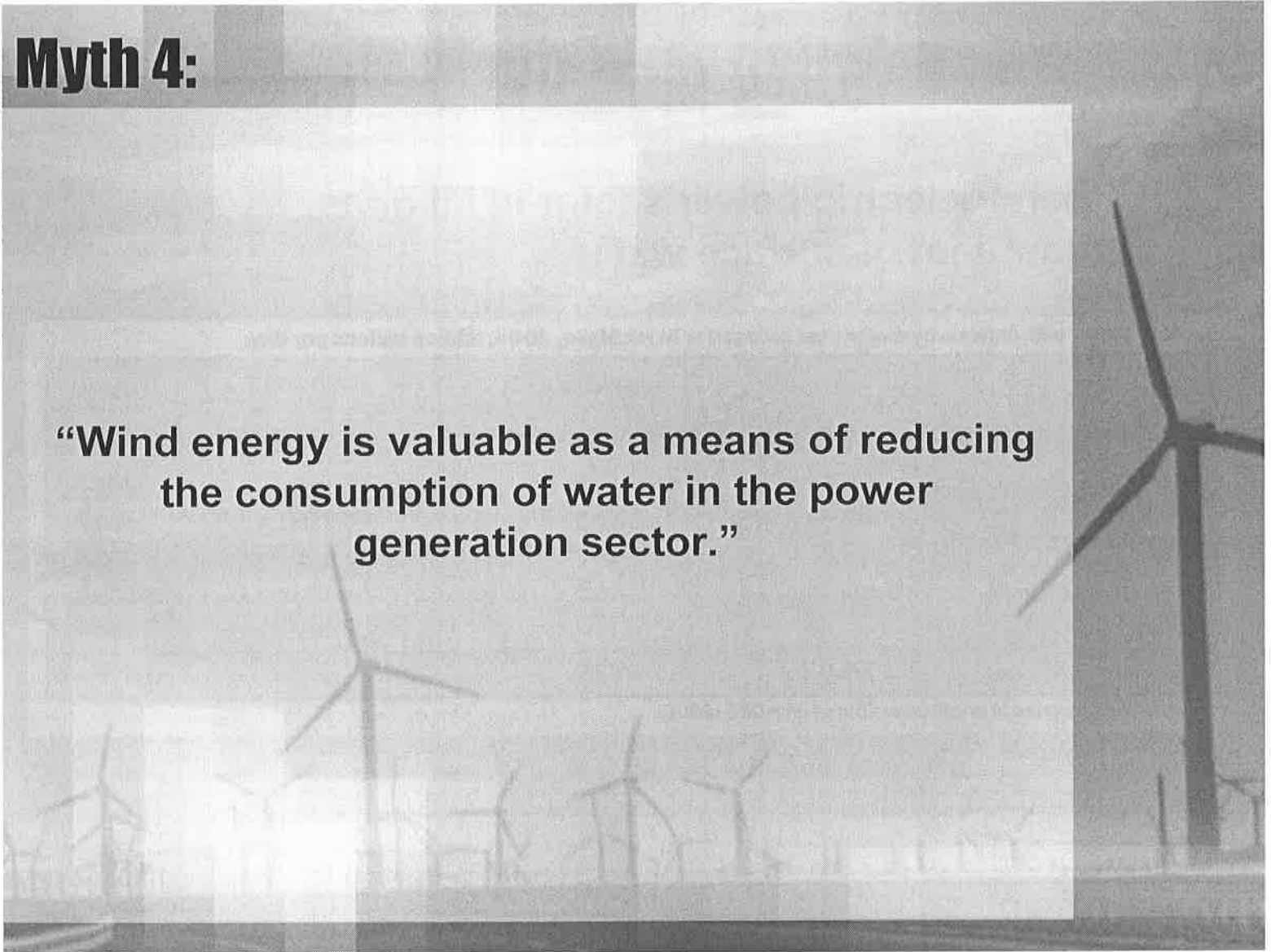
Gas would need to permanently remain above ~\$12/MMBtu for unsubsidized MI wind to be of any value as a hedge.

And:

I would argue that if a 20 year wind PPA at \$80/MWh is somehow “valuable” as a gas price hedge then a 20, 30 or 40 year PPA for Illinois nuclear or Canadian hydro at, say, \$50-60/MWh, would be superior.

Myth 4:

“Wind energy is valuable as a means of reducing the consumption of water in the power generation sector.”



Water consumption vs. water use:

....but it returns 98% of it to the source from which it is withdrawn.

Table 1. Consumptive-use coefficients by water-use category for the Great Lakes Basin

Water-use category	Median value (percent)	Range of values (percent)
Domestic and public supply	12	0-74
Industrial	10	0-35
Thermoelectric power	2	0-21
Irrigation	90	70-100
Livestock	83	0-100
Commercial	10	4-26
Mining	10	0-58

Source: Shaffer & Runkle, 2007

Water consumption relative to supply:

The MI power sector withdraws 8.4 billion gallons of water per day.

But the Great Lakes contain 6 quadrillion gallons of water.

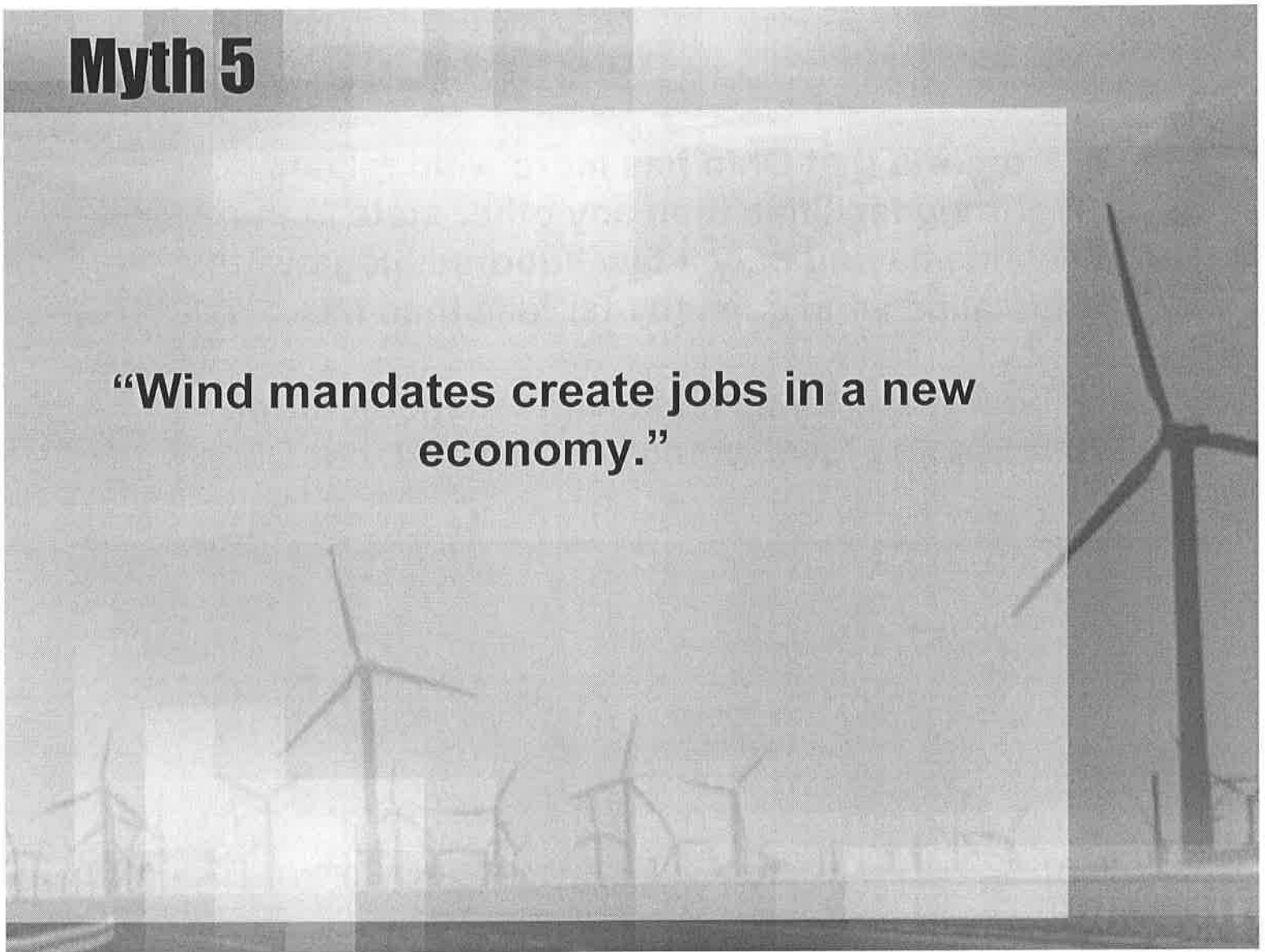
Thus the MI power sector withdraws only 0.00014% of the total volume of the Great Lakes per day and then returns 98% of it.

100 mi
200 km

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Myth 5

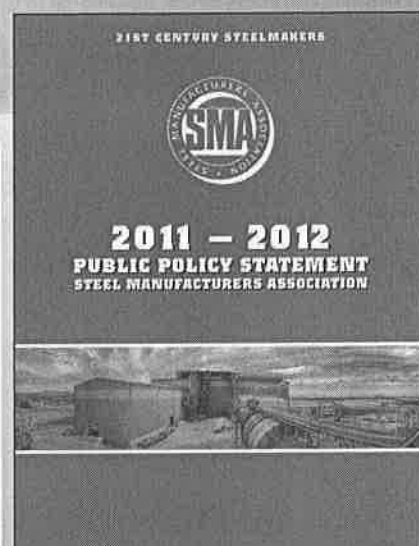
“Wind mandates create jobs in a new economy.”



Cost side of ledger?

EAF-based steel production is an energy intensive process that requires reliable and economically competitive energy supplies. The US steel industry spends over \$18 billion annually for electricity, and energy constitutes up to 15 percent of the cost of steelmaking. At the same time, this process is exceptionally energy efficient compared to other steel-making methods employed world-wide.

Just a 10% increase in electricity rates adds \$1.8 billion in costs to US steel industry alone. With 100,000 steel workers in the US, that is \$18,000.00/yr per employee no longer available for union wages and benefits. Our wind contracts at \$75/MWh are 2.5 times the 2014 MISO average wholesale price for electricity.



MISO analysis of draft Clean Power Plan:

Reference case & Phase 1 scenarios

Scenario	EPA Assumptions and Methodology	Cost per ton of CO ₂ reduction (\$/ton) *
Reference Case	MISO's MTEP-15 Business As Usual future assumptions**	-
Building Block 1	In 2020, apply a 6% heat rate improvement to all the coal-fired units at a capital cost of \$100/kW (amortized over 10 years).	5
Building Block 2	Calculate and enforce, starting in 2020, a minimum fuel burn for existing CC units to yield an annual 70% capacity factor.	53
Building Block 3	Calculate and add the equivalent amount of wind MWs to meet the incremental regional non-hydro renewable target.	237 <small>Present value calculation for costs is the driver for the higher cost.</small>
Building Block 4	Calculate the amount of energy savings for the MISO footprint and incorporate it as a 20-year EE program in the model.	70
All Building Blocks	Application of all building blocks.	60
CO ₂ Constraint	Application of a mass-based CO ₂ reduction target, allowing the model to optimize.	38

* The cost per ton of CO₂ reduction is indicative – actual values may vary depending on different input assumptions, etc.

** Assumptions matrix is available at <https://www.misoenergy.org/Events/Pages/PAC20140820.aspx>



EE program is 2nd. most expensive block:

Reference case & Phase 1 scenarios

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What of the alternative mass-based approach?

Reference case & Phase 1 scenarios

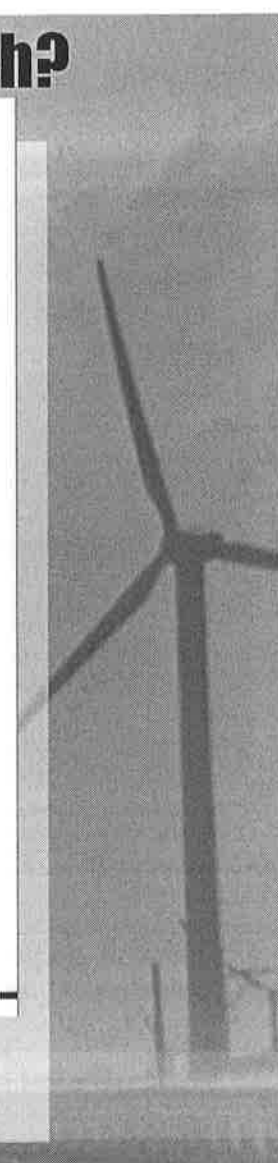
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MISO analysis concludes that simply using the mass-based CO₂ reduction target permitted under 111(d) yields the greater ratepayer benefit: \$38/ton versus \$60/ton.



And what about health impacts from emissions?

Michigan has constructed \$3 billion worth of wind turbines which roughly function as a 450MW intermittent generator.

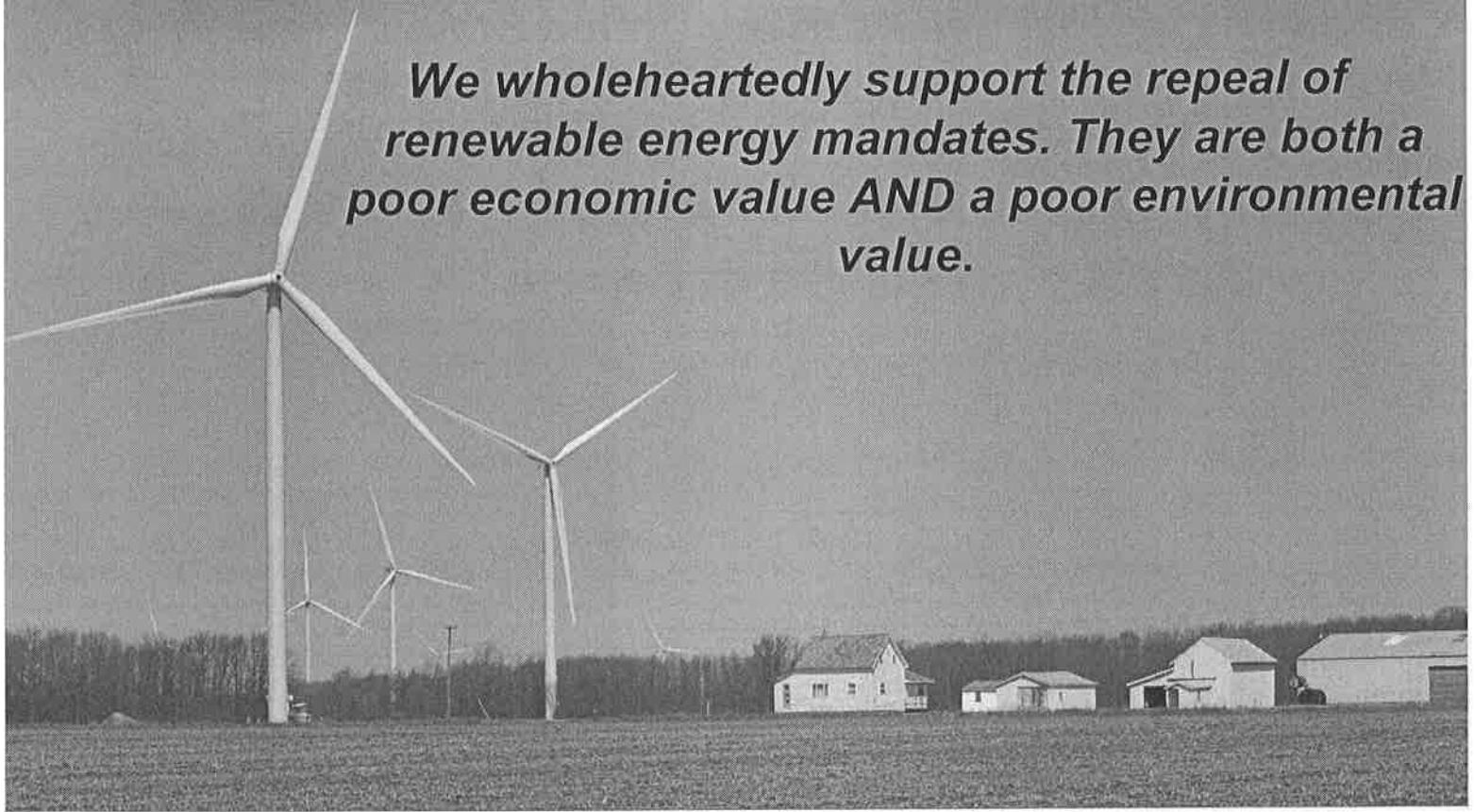
Assuming this wind generation only displaced MI coal generation, that expenditure would reduce coal plant emissions by 7%- but probably much less.

\$3 billion worth of new CCGT would have cut statewide HG and PM2.5 emissions by 50% and CO2 emission by 25%.

The IICC's humble request:

**Michigan's bipartisan supporters of the IICC send
a simple message:**

***We wholeheartedly support the repeal of
renewable energy mandates. They are both a
poor economic value AND a poor environmental
value.***



Questions:

Mr. Kevon Martis

**BA-University of MI-1989
Lenawee County Rural Land Use
Committee-vice-chairman-2007-09
Riga Township Planning
Commission-Vice-chairman 2005-
2011
Interstate Informed Citizen's
Coalition, Inc. Founding Director
2011-present**

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